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EXAMINER	
BELLO, AGUSTIN	

ART UNIT	PAPER NUMBER
2633	

DATE MAILED: 08/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/940,139	SAUNDERS, ROSS	
	Examiner	Art Unit	
	Agustin Bello	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 August 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *3/15/02, 10/15/01*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-2, 5, and 7-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roberts (U.S. Patent No. 5,963,312).

Regarding claim 1, Roberts teaches a method for isolating faults in an optical path of an optical network having a plurality of optical elements (column 1 lines 5-26; column 7 lines 23-25), comprising: transmitting an optical signal through the optical network (e.g. "optical transmission system for transmitting data" of column 2 lines 15-19), the optical signal having error detection data embedded therein (e.g. "test pattern" "multiplexed" or "interleaved" with the data traffic of column 2 lines 61-67), determining an error rate for the optical signal at an egress point of the optical network (column 3 lines 45-47 and column 6 lines 44-46), where the error rate is based on the error detection data embedded in the optical signal (e.g. "only the lower speed digital test signal" of column 6 lines 1-5 and column 6 lines 28-32); introducing a dither control signal into the optical signal at two or more of said plurality of optical elements (e.g. "test signal" of column 7 lines 54-67 and shown in Figure 8), and monitoring the error rate for the optical signal at the egress point of the optical network (e.g. "recovers test pattern in the manner described previously" of column 7 lines 56-58, and via the "eye" of column 6 lines 6-27 or the "BER counter" of column 6 lines 28-37), thereby isolating where a fault occurs in the

optical network ("FAULT LOCATION INFORMATION" OF Figure 6 and described in column 1 lines 5-26; column 7 lines 23-25). Roberts further teaches introducing a dither control signal into the optical signal at two or more of the optical elements by adjusting the gain of optical amplifiers of the system in response to error rate and fault location information (column 7 lines 35-36, Figure 6). As noted by the applicant (paragraph 0023 of the specification), adjusting the gain of an amplifier is a readily recognizable method for introducing a dither control signal into an optical signal.

Roberts differs from the claimed invention in that Roberts fails to specifically teach the use of partial regenerators. However, the applicant admits that partial regenerators are well known in the art (paragraph 0003 of the specification). One skilled in the art would have been motivated to use partial regenerators in the system of Roberts since they are known to provide lower cost and less power consumption, as noted by the applicant. Furthermore, Roberts specifically teaches that the method of the patent is applicable to other optical elements that process optical signals in an optical path (column 4 lines 31-35), thereby including partial regenerators. One skilled in the art could reasonable expect to succeed in using partial regenerators in the system of Roberts since Roberts teaches an optical transmission system and further that the method is applicable to a wide variety of optical elements. Therefore, it would have been obvious to one skilled in the art at the time the invention was made that partial regenerators could have been included in the device of Roberts and that the method disclosed by Roberts could have been applied to the partial regenerators of the system.

Regarding claim 2, Roberts differs from the claimed invention in that Roberts fails to specifically teach that the step of transmitting an optical signal further comprises embedding

error detection data in the B1 byte of a data frame in accordance with SONET protocol. However, as noted by the applicant (paragraph 0014 of the specification), embedding error detection data in the B1 byte of a data frame in accordance with SONET protocol for the purpose of error rate derivation is well known in the art. One skilled in the art would have been motivated to do so in order to use the same optical frequency as the data traffic for the error detection data (column 2 lines 64-67 of Roberts). One skilled in the art could reasonable expect to succeed in embedding error detection data in the B1 byte of a data frame in accordance with SONET protocol since Roberts also teaches that the error detection data of the system could be bit interleaved with the data traffic (column 5 lines 41-55) and mentions the compatibility of doing so with the SONET protocol. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to embed error detection data in the B1 byte of a data frame in accordance with SONET protocol as is well known in the art in the system of Roberts.

Regarding claim 5, Roberts teaches that the step of introducing a dither control signal further comprises introducing the dither control signal at a transmitter in the optical path (reference numeral 1 or 81 in Figure 8), thereby assessing if a fault exists downstream from the transmitter (via the upper monitoring receiver or lower monitoring receiver 82 in Figure 8).

Regarding claim 7, Roberts teaches the steps of introducing a dither control signal (e.g. "adjusting the gain" of column 7 lines 35-36) and monitoring the error rate for the optical signal (e.g. "recovers test pattern in the manner described previously" of column 7 lines 56-58, and via the "eye" of column 6 lines 6-27 or the "BER counter" of column 6 lines 28-37) are performed only when the error rate for the optical signal exceeds a predetermined threshold error rate indicative of a fault in the optical network (e.g. "corrective action" of column 6 lines 55 column

7 line 9). Roberts teaches introducing a dither control signal into the optical signal at two or more of the optical elements as a corrective action by adjusting the gain of optical amplifiers of the system in response to error rate and fault location information (column 7 lines 35-36, Figure 6). As noted by the applicant (paragraph 0023 of the specification), adjusting the gain of an amplifier is a readily recognizable method for introducing a dither control signal into an optical signal.

Regarding claim 8, Roberts teaches a method for isolating faults in an optical path of an optical network having a plurality of optical elements (column 1 lines 5-26; column 7 lines 23-25), comprising: transmitting an optical signal through the optical network (e.g. "optical transmission system for transmitting data" of column 2 lines 15-19), determining a baseline error rate for the optical signal at an egress point of the optical network (e.g. "threshold" which "can be set" and therefore determined of column 7 lines 7-9); introducing a dither control signal into the optical signal at a first optical element (e.g. "test pattern" "multiplexed" or "interleaved" with the data traffic of column 2 lines 61-67), determining a first error rate for the optical signal at the egress point of the optical network (e.g. "recovers test pattern in the manner described previously" of column 7 lines 56-58, and via the "eye" of column 6 lines 6-27 or the "BER counter" of column 6 lines 28-37 and "From First Monitor" of Figure 5); and evaluating the first error rate in relation to the baseline error rate (reference numeral 56 in Figure 5), thereby assessing if a fault exists downstream from the first partial regenerator (e.g. "Yes" "No" decision after block 56 in Figure 5). Roberts differs from the claimed invention in that Roberts fails to specifically teach the use of partial regenerators. However, the applicant admits that partial regenerators are well known in the art (paragraph 0003 of the specification). One skilled in the

art would have been motivated to use partial regenerators in the system of Roberts since they are known to provide lower cost and less power consumption, as noted by the applicant. Furthermore, Roberts specifically teaches that the method of the patent is applicable to other optical elements that process optical signals in an optical path (column 4 lines 31-35), thereby including partial regenerators. One skilled in the art could reasonable expect to succeed in using partial regenerators in the system of Roberts since Roberts teaches an optical transmission system and further that the method is applicable to a wide variety of optical elements. Therefore, it would have been obvious to one skilled in the art at the time the invention was made that partial regenerators could have been included in the device of Roberts and that the method disclosed by Roberts could have been applied to the partial regenerators of the system.

Regarding claim 9, Roberts teaches introducing a dither control signal into the optical signal at a transmitter residing in the optical path (e.g. "test signal" of column 7 lines 54-67 and shown in Figure 8 and reference numeral 1 or 81 in Figure 8); determining a first error rate for the optical signal at the egress point of the optical network; and evaluating the first error rate in relation to the baseline error rate (e.g. "recovers test pattern in the manner described previously" of column 7 lines 56-58, and via the "eye" of column 6 lines 6-27 or the "BER counter" of column 6 lines 28-37 and "From First Monitor" of Figure 5), thereby assessing if a fault exists downstream from the transmitter (via the upper monitoring receiver or lower monitoring receiver 82 in Figure 8).

Regarding claim 10, Roberts obviates the use of partial regenerators as discussed regarding claim 8, and teaches (a) introducing a dither control signal into the optical signal at a second partial regenerator located downstream from the first partial regenerator (e.g. "test signal"

of column 7 lines 54-67 and shown in Figure 8 and reference numeral 81 in Figure 8), (b) determining a second error rate for the optical signal at the egress point of the optical network (e.g. "From Penultimate Monitor" of Figure 5); and (c) evaluating the second error rate in relation to the baseline error rate (reference numeral 51 in Figure 5), thereby assessing if a fault exists downstream from the second partial regenerator (e.g. "Yes" "No" decision after block 51 in Figure 5).

Regarding claim 11, Roberts obviates the use of partial regenerators as discussed regarding claim 8, and further teaches repeating steps (a) thru (c) for each of said plurality of optical elements in the optical network (as is evident from Figure 5, "From First Monitor" "From Penultimate Monitor" "From End Receiver").

3. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Roberts in view of Bergano (U.S. Patent No. 6,744,992).

Regarding claim 3, Roberts differs from the claimed invention in that Roberts fails to specifically teach that determining an error rate further comprises calculating Q for the optical signal at the egress point of the optical network. However, determining an error rate by calculating Q for an optical signal at the egress point of an optical network is well known in the art. Bergano, in the same field as optical communication, teaches determining an error rate by calculating Q (reference numeral 605 in Figure 6) for an optical signal at the egress point of an optical network. One skilled in the art would have been motivated to determine the error rate by calculating Q for an optical signal in order to determine transmission performance of the signals after propagation through the system (column 7 lines 29-36 of Bergano). Furthermore, as noted by the applicant (paragraph 0018 of the specification), the relationship between Q and the bit

error rate BER is well known in the art. As such, one skilled in the art would clearly have recognized the relationship between the BER of Roberts (column 6 lines 28-32) and the method of calculating Q taught by Bergano. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to determine an error rate by calculating Q for an optical signal at the egress point of an optical network as taught by Bergano in the system of Roberts.

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Roberts in view of Barnard (U.S. Patent No. 6,742,154).

Regarding claim 4, Roberts differs from the claimed invention in that Roberts fails to specifically teach that the step of determining an error rate further comprises deriving the error rate from the number of corrected errors in a forward error correction scheme. However, determining an error rate by deriving the error rate from the number of corrected errors in a forward error correction scheme is well known in the art. Barnard, in the same field of optical communication, teaches it is well known in the art to derive an error rate from the number of corrected errors in a forward error correction scheme (abstract). One skilled in the art would have been motivated to derive the error rate in this manner in order to balance the performance of different channels (column 2 lines 47-57 of Barnard). One skilled in the art could reasonable expect to succeed in implementing the method of Barnard in the system of Roberts since Barnard teaches that the method is particularly applicable to fiber optic communication networks such as that taught by Roberts. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to derive an error rate from the number of corrected errors in a forward error correction scheme as taught by Barnard in the system of Roberts.

5. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Roberts in view of Fatehi (EP 0580316 A1).

Regarding claim 6, Roberts obviates the use of partial regenerators and teaches introducing a dither control signal to each of those optical elements in an effort to assess if a fault exists downstream from a given partial regenerator as discussed regarding claim 1. Roberts differs from the claimed invention in that Roberts fails to specifically teach that the step of introducing a dither control signal further comprises sequentially introducing the dither control signal at each of said plurality of partial regenerators, thereby assessing if a fault exists downstream from a given partial regenerator. However, sequentially introducing a dither control signal in order to determine fault location is a well known concept. Fatehi, in the same field of optical communication, teaches that this concept is well known in the art (column 1 line 52 – column 2 line 8). One skilled in the art would have been motivated to sequentially introduce the dither control signal, as Fatehi teaches is well known in the art, in the system of Roberts in order to reduce the number of monitoring receivers, thereby reducing the overall cost of the system (column 2 lines 6-8 of Fatehi). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to introduce a dither control signal sequentially at each of said plurality of partial regenerators, thereby assessing if a fault exists downstream from a given partial regenerator as is well known in the art according to Fatehi in the system of Roberts.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Agustin Bello whose telephone number is (703)308-1393. The examiner can normally be reached on M-F 8:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (703)305-4729. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Agustin Bello
Examiner
Art Unit 2633

AB